

# Toughpower™ QFan

CableManagement **650W**

**Patented Design**

*ATX 12V 2.2 & EPS 12V*



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COOLall YOUR LIFE

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UL  
E161451



CB

FC

R43016

CE



*~Toughpower with QFan Technology~*

# **/Toughpower QFan**

*CableManagement 650W ATX12V 2.2 & EPS 12V Version*

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## ***1. Introduction***

### ***1.1 Statement***

We live up to the promise of Thermaltake logo in our unending quest for excellence. Shall you have any suggestion or comments, please access our website:

***Http://www.thermaltake.com***

or e-mail to:

***thermaltake@thermaltake.com***

We appreciate your kindly feedback and you will receive the prompt response from our customer service team.

Please take the time in familiarizing yourself with the power supply, its connectors and the contents of this manual before proceeding with the installation of the power unit. You will need a Philips crosshead screwdriver, perhaps your PC case manual and most certainly your motherboard manual.

Should you have any questions regarding the content of the manual, please contact Thermaltake directly. Failure to follow the proper procedures may cause severe bodily harm or PC component damage.

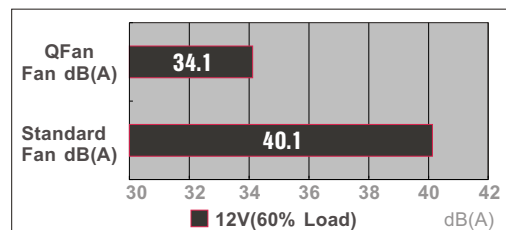
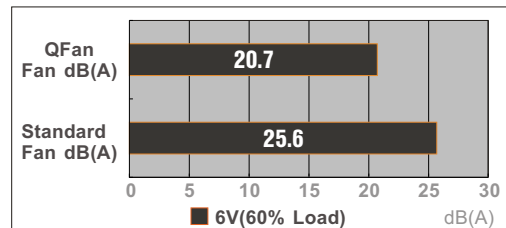
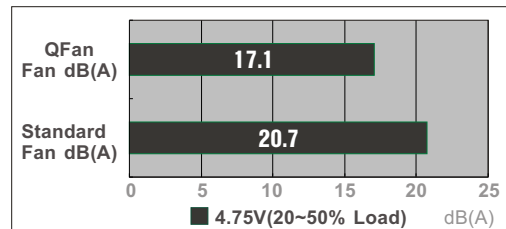
## ***1.2 Warnings and Cautions***

- 1.2.1** Do not unplug the AC power cord when the power supply is in use. Doing so may cause damages to your components.
- 1.2.2** Do not place the power supply in a high humidity and temperature environment.
- 1.2.3** When using Toughpower QFan Cable Management 650W power supply under testing conditions where the power supply unit is not installed in a PC with its components, please follow the steps below:
  - 1) Please take a paper clip and untwist it.
  - 2) Make sure the power supply unit is in the "OFF" position.
  - 3) Locate the 20+4 pin motherboard connector from the power supply unit.
  - 4) Plug one side of the paper clip into the green wire hole.
  - 5) Plug the other side of the paper clip into any of the black wire holes.
  - 6) Turn on the PSU to see if the power supply fan(s) turn(s) on.
- 1.2.4** High voltages exist in the power supply. Do not open the power supply case unless you are an authorized service technician or electrician.
- 1.2.5** All warranties and guarantees will be voided, if failure to comply with any of the warnings and cautions covered in this manual.

## 2. Product Features

### 2.1 Special non-frame QFan Technology: decreases 17% noise level compare with regular 140mm fan

Toughpower QFan 500W/650W power supplies come with our latest special design 140mm ball-bearing fan. This fan has outstanding acoustic performance that will not drive you crazy with high noise level.



### 2.2 Excellent Efficiency (up to 85%)

Toughpower QFan 500W / 650W provide excellent efficiency and hence reducing energy consumption. The higher the Efficiency the more you will save on your energy bill.

### 2.3 Extremely good voltage regulation ( $\pm 3\%$ )

This feature allows tighter load regulation ( $\pm 3\%$ ) than other power supplies ( $\pm 5\%$ ) and increase system voltage stability.

### 2.4 MTBF > 120,000 hours (Highly reliable)

120,000 hours of MTBF (Mean Time between Failures) goes above and beyond all ATX specifications.

### 2.5 Independent +12V rails

Toughpower QFan 500W & 650W built in independent +12V rails are provided to support the high-end graphic card and PC system.

### 2.6 Cable Management

Cable Management enables users to remove unused cables and significantly improves the airflow in the chassis.

### 2.7 Industrial grade components (capacitor, transformer, etc)

All components are specially designed for industrial environment and extreme conditions.

# /Toughpower QFan

*CableManagement 650W ATX12V 2.2 & EPS 12V Version*

## 2.8 Hi-Tech Black Coating

With special Hi-Tech Black coating, Toughpower QFan Cable Management 650W PSUs looks professional, elegant and unique.









## 2.9 High +5VSB Output

Built-in higher +5VSB (from 3A to 3.5A(Peak Current)) supports up to 12 USB devices. Also, even the system is power off, USB devices can still be charged by the 3A sustained output.

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## 3. Components Check

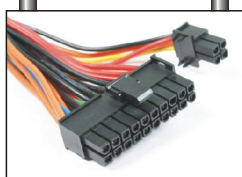
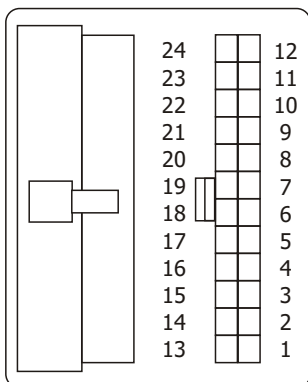
- 1** One Toughpower QFan 650W power supply unit(w/one 20+4pin main power connector & one 8-pin PCI-E connector)  

- 2** Two sets of wire w/6pin PCI-E connector  

- 3** Two sets of wires w/5pin SATA connector  

- 4** Two sets of wire w/4pin peripheral connector  

- 5** One set of 8-pin to 6-pin PCI-E adapter  

- 6** One AC Input power cord  

- 7** 4 mounting screws  

- 8** User manual  


## 4. Connectors & Cables

### 4.1 Connectors

#### 4.1.1 Main Power Connector (20+4 pin)

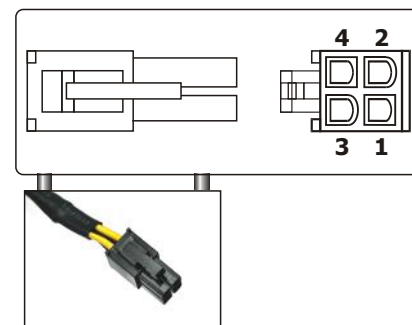
Support the latest ATX 12V 2.2 system motherboard



| Voltage | Color  | PIN | PIN | Color  | Voltage |
|---------|--------|-----|-----|--------|---------|
| +3.3V   | Orange | 1   | 13  | Orange | +3.3 V  |
| +3.3V   | Orange | 2   | 14  | Blue   | -12 V   |
| GND     | Black  | 3   | 15  | Black  | GND     |
| +5V     | Red    | 4   | 16  | Green  | PS_ON   |
| GND     | Black  | 5   | 17  | Black  | GND     |
| +5V     | Red    | 6   | 18  | Black  | GND     |
| GND     | Black  | 7   | 19  | Black  | GND     |
| PG      | Gray   | 8   | 20  | N/C    | N/C     |
| +5Vsb   | Purple | 9   | 21  | Red    | +5 V    |
| +12V3   | Yellow | 10  | 22  | Red    | +5 V    |
| +12V3   | Yellow | 11  | 23  | Red    | +5 V    |
| +3.3 V  | Orange | 12  | 24  | Black  | GND     |

#### 4.1.2 CPU Connector (4 pin)

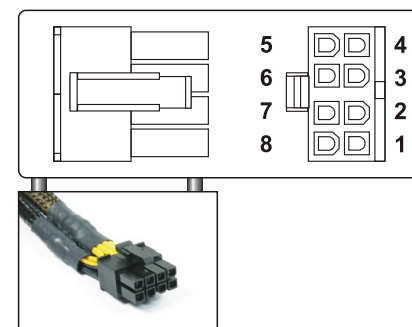
Support both dual core CPU and single core CPU systems motherboard



| Color  | Signal | Pin |
|--------|--------|-----|
| Black  | GND    | 1   |
| Black  | GND    | 2   |
| Yellow | +12V1  | 3   |
| Yellow | +12V1  | 4   |

#### 4.1.3 CPU Connector (8 pin)

Support the 8-pin EPS 12V system motherboard



| Color  | Signal | Pin |
|--------|--------|-----|
| Black  | GND    | 1   |
| Black  | GND    | 2   |
| Black  | GND    | 3   |
| Black  | GND    | 4   |
| Yellow | +12V1  | 5   |
| Yellow | +12V1  | 6   |
| Yellow | +12V2  | 7   |
| Yellow | +12V2  | 8   |

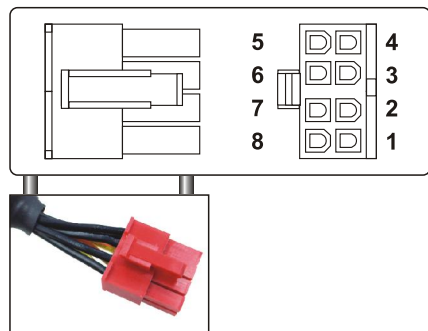


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## 4.1.4 PCI-E Connector (8 pin)

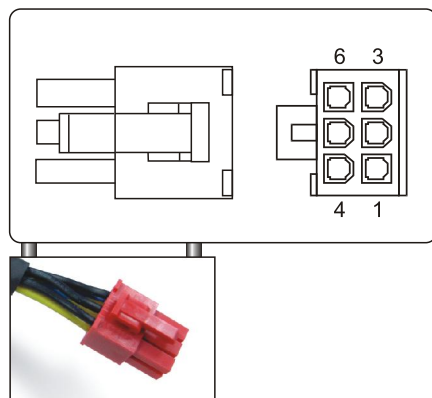
Support next generation 8 pin sockets on high-end graphic cards and can support the existing 6 pin sockets by connecting to the 8 pin to 6 pin converter.



| Color       | Signal | Pin |
|-------------|--------|-----|
| Yellow/Blue | +12V3  | 1   |
| Yellow/Blue | +12V3  | 2   |
| Yellow/Blue | +12V3  | 3   |
| Black       | GND    | 4   |
| Black       | GND    | 5   |
| Black       | GND    | 6   |
| Black       | GND    | 7   |
| Black       | GND    | 8   |

## 4.1.5 PCI-E Connector (6 pin)

Support the latest high-end graphic cards with 6 pin socket



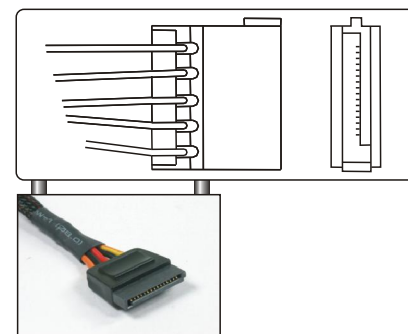
| Color  | Signal | Pin |
|--------|--------|-----|
| Yellow | 12V2   | 1   |
| Yellow | 12V2   | 2   |
| Yellow | 12V2   | 3   |
| Black  | GND    | 4   |
| Black  | GND    | 5   |
| Black  | GND    | 6   |

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## 4.1.6 SATA Connector (5 pin)

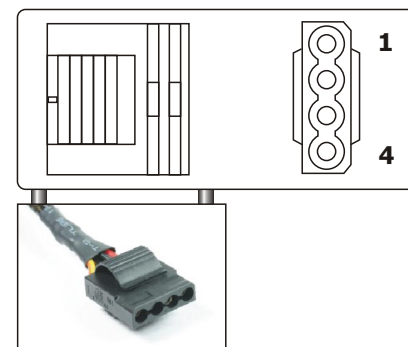
Support the new generation high-speed SATA devices



| Color  | Signal | Pin |
|--------|--------|-----|
| Yellow | +12V4  | 1   |
| Black  | GND    | 2   |
| Red    | +5V    | 3   |
| Black  | GND    | 4   |
| Orange | 3.3V   | 5   |

## 4.1.7 Peripheral Connector (4 pin)

Support IDE/SCSI (HDD/CD/DVD..etc) devices



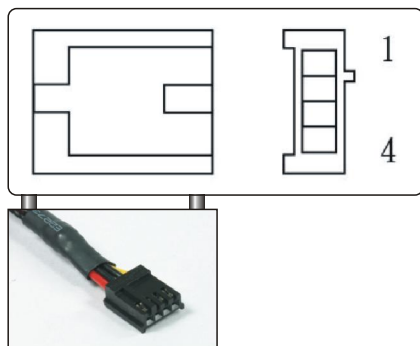
| Color  | Signal | Pin |
|--------|--------|-----|
| Yellow | +12V4  | 1   |
| Black  | GND    | 2   |
| Black  | GND    | 3   |
| Red    | +5V    | 4   |

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## 4.1.8 Floppy Disk Connector (4 pin)

Support Floppy Disk and some other additional devices



| Color  | Signal | Pin |
|--------|--------|-----|
| Red    | +5V    | 1   |
| Black  | GND    | 2   |
| Black  | GND    | 3   |
| Yellow | +12V4  | 4   |

## 4.1.9 8-pin PCI-E to 6-pin PCI-E adapter



8-pin PCI-E connector is able to use for 6-pin PCI-E connector graphic card by the adapter.

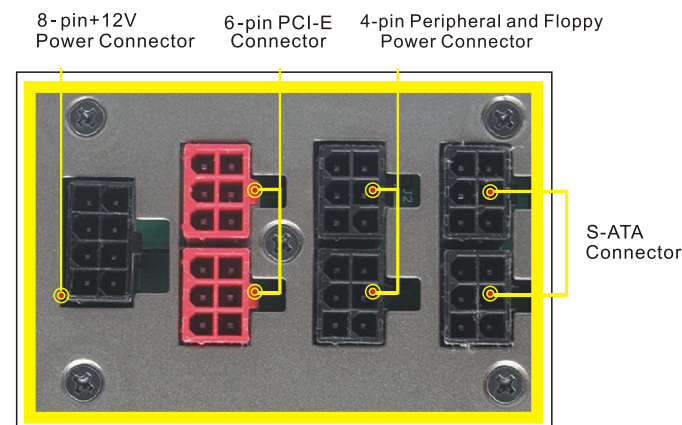
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## 4.2 Cables

Users can optimize the cables arrangement within the chassis by using only what users need. This feature increases the airflow and reduces the overall ambient temperature within the chassis, also improves the overall look and tidiness of the system.

**Embedded Socket and Modularized Cable Management Design:**



**4.2.1 Toughpower QFan 650W unit:** On the power supply, you will find sockets to connect with those cables. Users can choose which wire set they want to use for devices, graphic card, fans, etc. Inside the package, you will find the following wire set:

| Connector | 1 x 24/20-pin motherboard connector                   | 500mm                         |
|-----------|---|-------------------------------|
|           | 1 x 8/4-pin EPS12V connector                          | 500mm                         |
|           | 2 x 6-pin PCI-E connector, 1 x 8-pin PCI-E connector  | 500mm                         |
|           | 2 x triple SATA power connectors                      | 500mm+150mm+150mm             |
|           | 1 x quad 4-pin IDE & single floppy power connectors   | 500mm+150mm+150mm+150mm+150mm |
|           | 1 x triple 4-pin IDE & single floppy power connectors | 500mm+150mm+150mm+150mm       |

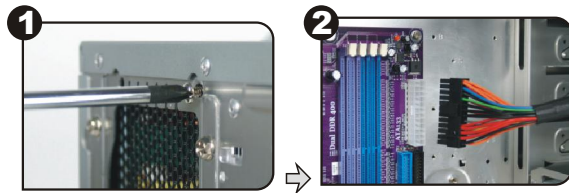


## 5. Installation Steps

To prevent electrical shocks, please disconnect the power cord from your existing power supply unit. Toughpower QFan 650W Power Supply has automatic voltage selector which will automatically change to 100V-240V PSU.

### Step 1

After install the power supply unit into the chassis and then connect the 20+4-pin main power cable to motherboard 20pin or 24 pin socket.



### Step 2

Connect the 4-pin / 8-pin +12V power connector to motherboard (User can use either 4-pin or 8-pin to connect motherboard socket, please check your motherboard user manual for detail information)



### Step 3

**Note: Please check the below information before install your Dual PCI-Express graphic cards.**

The Toughpower QFan 650W Cable Management Power Supply has three PCI-Express connectors.

The 8-pin PCI-Express connectors comes out directly from the power supply unit, the other two 6-pin PCI-Express connectors are modularized design.

The 8-pin PCI-Express connector is able to use for 6-pin PCI-Express graphic card by the 8-pin to 6-pin PCI-E adapter.

For the below SLI and CrossFire dual graphic card mode, you have to use one PCI-Express connector which comes out from the power supply unit and one modularized PCI-Express connector for best performance and stability.

| NVIDIA SLICard     | ATICrossFire Card   |
|--------------------|---------------------|
| GeForce 7900 GTX   | Radeon X1950 series |
| GeForce 7800 GTX   | Radeon X1900 series |
| GeForce 6800 Ultra | Radeon X1800 series |
| GeForce 6800 GT    |                     |
| GeForce 6800       |                     |
| GeForce 6800       |                     |

**\* Note: If you are intend to buy the latest NVIDIA or AMD Graphic Card, please check our website to ensure the compatibility.**

For other entry level SLI or CrossFire graphic cards, you can use two 6-pin modularized PCI-Express connectors.

First, high-level SLI or CrossFire dual graphic card mode installation:

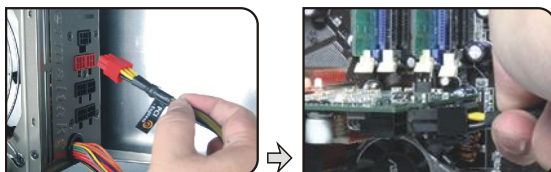
Connect the PCI-Express connector which comes out from power supply unit and one 6-pin modularized PCI-Express connector to your dual graphic cards.

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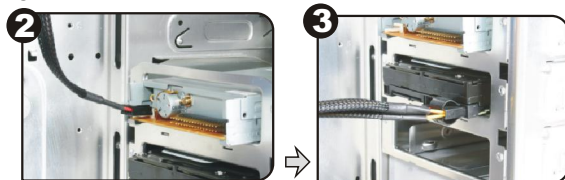


Second, entry-level SLI or CrossFire dual graphic card mode installation:  
Connect the two 6-pin modularized PCI-Express connector to your dual graphic cards.



## Step 4

Connect the 4 pin power connector to peripheral devices such as DVD-Burner, hard drive, and etc. In addition, user can connect the 4-pin floppy power connector to connect the floppy drive.



If your devices are S-ATA interface, there are also S-ATA connectors available.



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## 6. +12V Rail Distribution

|                     | W0151 650W | W0163 650W |
|---------------------|------------|------------|
| 24 pin +12V         | 12V3       | 12V3       |
| 4 pin +12V          | 12V1       | 12V1       |
| 8 pin +12V          | 12V1       | 12V1,12V2  |
| Peripheral & Floppy | 12V3       | 12V4       |
| S-ATA               | 12V3       | 12V4       |
| 6 pin Modular PCI-E | 12V2       | 12V2       |
| 6 pin Modular PCI-E | 12V2       | 12V2       |
| 8 pin Native PCI-E  | N/A        | 12V3       |

For the Toughpower QFan 650W model, please follow below connector' s operation instruction.

1. If you are using 8pin CPU +12V connector and only one graphic card w/ one PCI-E connector, please use native PCI-E connector to your card.
2. If you are using 4pin CPU +12V connector and only one graphic card w/ one PCI-E connector, please use modular PCI-E connector to your card.
3. If you are using 8pin CPU +12V connector and two graphic cards, please use one Modular PCI-E connector and one native PCI-E connector to your cards.

**Note:** If you are intend to buy the latest NVIDIA or AMD Graphic Card, please check our website to ensure the compatibility.

## 7. SPEC Table

| Model  | W0163  |                          |                              |        |
|--|--|--------------------------|------------------------------|--------|
| SPECIFICATION  |  |                          |                              |        |
| Power  | 650W   |                          |                              |        |
| Dimension  | 160mm(L)x150mm(W)x86mm(H)                      |                          |                              |        |
| Switches   | ATX Logic on-off additional power rockerswitch |                          |                              |        |
| PFC  | Active PFC (PF > 0.9)                          |                          |                              |        |
| Cooling System   | 3D Flow 140mm Fan, 1900RPM ± 10%               |                          |                              |        |
| Noise  | 17.1 dBA at 20%~50% Load                       |                          |                              |        |
| P. G. Signal   | 100-500 ms                                     |                          |                              |        |
| Efficiency   | up to 85%                                      |                          |                              |        |
| Hold-up Time   | 16ms   |                          |                              |        |
| INPUT  |  |                          |                              |        |
| Input Voltage  | 115 VAC ~ 230 VAC                              |                          |                              |        |
| Input Frequency Range  | 47 ~ 63 Hz                                     |                          |                              |        |
| MTBF   | > 120,000 hrs                                  |                          |                              |        |
| Input Current  | 100Vac/8A Max. 200Vac/4A Max.                  |                          |                              |        |
| OUTPUT   |  |                          |                              |        |
|  | Max/Min  | Regulation <sup>*1</sup> | Ripple & Noise <sup>*2</sup> | Output |
| +3.3V  | 30A/0.5A                                       | +3,-3%                   | 50mV                         | 99W    |
| +5V  | 30A/2.0A                                       | +3,-3%                   | 50mV                         | 140W   |
| +12V1  | 18A/1.0A                                       | +3,-3%                   | 120mV                        | 624W   |
| +12V2  | 18A/1.0A                                       | +3,-3%                   | 120mV                        |        |
| +12V3  | 18A/1.0A                                       | +3,-3%                   | 120mV                        |        |
| +12V4  | 18A/1.0A                                       | +3,-3%                   | 120mV                        |        |
| -12V   | 0.8A/0.0A                                      | +9,-5%                   | 120mV                        | 9.6W   |
| +5Vsb  | 3.0A/0.0A                                      | +5,-3%                   | 50mV                         | 15W    |
| Total Power  | 650W   |                          |                              |        |
| Peak Power   | 750W   |                          |                              |        |
| *1. With 5Vsb from 3A to 3.5A(Peak Current), Toughpower QFan 650W could support up to 10~12 USB devices. |  |                          |                              |        |
| *2. USB devices can be charged even when the PC is power of.   |  |                          |                              |        |
| ENVIRONMENT  |  |                          |                              |        |
| Operating Temp.  | 10 °C to 50 °C                                 |                          |                              |        |
| Storage Temp.  | -20 °C to 70°C                                 |                          |                              |        |
| Operating Humidity   | 20% to 90%, non-condensing                     |                          |                              |        |
| Storage Humidity   | 5% to 95%, non-condensing                      |                          |                              |        |
| PROTECTION   |  |                          |                              |        |
|  | DC rail  | Trigger Point/Range      |                              |        |
| Over Voltage Protection  | +3.3V trip point                               | 7.0 Vmax                 |                              |        |
|  | +5.0V trip point                               | 4.5 Vmax                 |                              |        |
|  | +12.0V trip point                              | 15.6 Vmax                |                              |        |
| Over Current Protection  | +3.3V  | 35A ~ 45A                |                              |        |
|  | +5.0V  | 33A ~ 45A                |                              |        |
|  | +12V1 & +12V2 & +12V3 & +12V4                  | 21A ~ 29A                |                              |        |
| Short Protection   | All output to GND                              |                          |                              |        |

## 8. Other Specification

### 8.1 Inrush Current:

55A max. when AC input 115Vac at 25°C cold start.  
110A max. when AC input 230Vac at 25°C cold start.

### 8.2 Power Efficiency

80%(min.) at full load(typical)

### 8.3 CE Requirements

#### 8.3.1 Conducted EMI

1. Meet FCC: ClassB
2. Meet CISPR 22: ClassB
3. Meet BSM I: ClassB

#### 8.3.2 Safety Standards

1. Meet CUL (U L 6095 0 )
2. Meet TUV EN60950
3. Meet CB (IE C 950)
4. Meet CE

#### 8.3.3 Harmonic

Meet IEC1000-3-2, Class D

## ***9. Trouble Shooting***

### ***Condition 1:***

**No DC output. The fan or fans are motionless. Check:**

- 1-1 Is the AC inlet plug firmly plugged into the PSU inlet socket?
- 1-2 Is the wall socket, extension power cord, power strip or surge protector in use, fully functional and wall power switch turned 'ON' ?
- 1-3 Is the Main Board socket (20+4 pin) plug fully and firmly inserted?

### ***Condition 2:***

**The fan or fans began rotating and then stopped. The system hangs without proceeding any further Check:**

- 2-1 Are the peripheral connectors firmly plugged into accessory devices, such as the main hard drive, CD ROM, etc?
- 2-2 If a plug has been inadvertently connected in an off-set or reversed position, unplug the AC power source, reconnect the offending connectors and then wait for 30 seconds before replug in the AC power source and try again.

*Note: If the power supply is still unable to power up after following the above instruction, please send the unit back to your dealer or retailer for after sales service.*

## ***10. Contact us***

**For further technical supports or general inquiries, please contact us at:**

### ***Thermaltake Technology USA***

Toll Free: (800)988-1088

Email: support-usa@thermaltake.com

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